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WATTS

10-2013

Year 83 + 10m

Monthly newsletter of the Pretoria Amateur Radio Club
Maandelikse nuusbrief van die Pretoria Amateur Radio Klub.

PARC, PO Box 73696, Lynnwood Ridge 0040, RSA

web http://www.parc.org.za mail: zs6pta@zs6pta.org.za

Bulletins: 145,725 MHz 08:45 Sundays/Sondae
Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
Activated frequencies are announced prior to bulletins
Swapshop: 2m and 7.066 MHz Live on-air after bulletins
Bulletin repeats Mondays | herhalings : Maandae 2m 19:45

SARL VHF Contest 21-22 Sept.

PARC, MRK, CEN combined effort . More on p2 and 3

In this issue In hierdie uitgawe

- Member news and activities Lede-nuus en Aktiwiteite
  VHF Contest pictures
- Technical | Salt water dummy load | Tegnies
  HD radio
  Refraction, diffraction, Doppler
- Page eight -- Bladsy agt

Next club events

Fleamarkets at PMC
Sat 7 Dec

Club social at U.P.
Thursday 3 Oct. 7pm
APRS talk by Riaan ZS6RXY
Club committee meeting
Thursday 17 Oct. 7pm

PARC Management team / Bestuurspan Aug. 2013 – Aug. 2014

Committee members

Chairman, Contests, Liason	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Vice Chairman, SARL liason	Fritz Sutherland	ZS6SF	fritzs@icon.co.za	012-811-3875	083-304-0028
Secretary	Jean de Villiers	ZS6ARA	zs6ara@webmail.co.za	012-663-6554	083-627-2506
Treasurer, SARS	Andre van Tonder	ZS6BRC	andreh.vtonder@absamail.co.za	361-3292	082-467-0287
Motorsport, Social	Johan de Bruyn	ZS6JHB	zs6jhb@gmail.com	012-803-7385	079-333-4107
Web co-ordination	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
RAE, Bulletin co-ordinator	Vincent Harrison	ZS6BTY	zs6bty@telkomsa.net	012-998-8165	083-754-0115
Repeaters	Craig Symington	ZS6RH	zs6rh@hotmail.co.za		081-334-6817
Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Clubhouse	Pieter Fourie	ZS6CN	pieter2@vodamail.co.za	012-804-7417	083-573-7048
Club activities	Richard Peer	ZS6UK	zs6uk@peer.co.za	012-333-0612	082-651-6556

Co-opted/Geko-opteer:

Auditor	Tony Crowder	ZS6CRO	tcrowder@telkomsa.net	011-672-3311	
WATTS newsletter/Kits	Hans Kappetijn	ZS6KR	zs6kr@wbs.co.za	012-333-2612	072-204-3991
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Digital, photographer,sound	Theo Bresler	ZS6TVB	theo@bresler.co.za		082-698-1742

VHF contest

The weather was not kind to competitors that week end but did not dampen their enthousiasm

Many visitors also added to the enjoy-ment of the occasion.

Birthdays Oct.
Verjaarsdae

01 Evan ZS6ELI
02 Hans-Peter ZS6AJS
02 Andre ZS6BRC
03 Poppie ZS6BCP, lv van Hansie ZS6AIK
06 Danny ZS6AW
10 Harry ZS6AMP (80)
10 Roy ZS6MI
14 Iza ZR6IZA
14 Gary ZR6TB, son of Selma and Joe ZS6TB
16 Hennie, seun van Poppie ZS6BCP en Hansie ZS6AIK
20 Corlene, dogter van Poppie ZS6BCP en Hansie ZS6AIK
20 Martinho ZS6BQP
22 Marieza, dogter van Marelise en Pierre ZS6PJH
28 Tracy, daughter of Joey and Graham ZS6GJR
29 Pierre, seun van van Marelise en Pierre ZS6PJH
30 Andre ZS6GCA
31 Darlington, OM of Hilary ZR6HAP

Oct. Anniversaries
Herdenkings

02 Erna en Whitey ZS6JJJ (42)
06 Poppie ZS6BCP en Hansie ZS6AIK (51)

Lief en Leed | Joys and Sorrows

Pine ZS6OB had a bout of bronchitis
Gawie ZS6GJJ was in die hospitaal met longontsteking
Peggy, sw of Ed ZS6UT needed urgent hospitalization
"JB" ZS6YV is having some tests done

Diary | Dagboek (UTC times)

Oct

03	**Club social and talk by ZS6RXY**
05	SARL 80m QSO party 17:00-20:00
05-06	Oceana DX Contest Phone 08:00-08:00
12-13	Oceana DX Contest CW 08:00-08:00
12-13	Scandinavian Activity Contest 12:00-12:00
19-20	10-10 International CW Contest 00:01-23-59
19-20	Worked all Germany Contest 15:00-14:59
26-27	CQ WW Contest SSB 00:00-24:00

Snippets | Brokkies

From the HRD website:
The free version of the popular amateur radio software HRD will no longer be available for download from HRD Software LLC after August 31. All 5.x Files will be removed from the server on September 1, 2013. You may host these files on yourserver or have them on a CD, but you may NOT charge for the CD or the access to your server.

SARL Historian.
Craig Newham **ZS6NEW** (cnewham@gmail.com) has been appointed SARL historian and anyone with items of interest relating to the SARL can pass it on to him. Information is scattered all over the country and must be gathered before it gets lost forever.

Strange connector configuration. (Tnx ZS6KED)

New Members | Nuwe Lede

Applications were received but not yet processed

BHF Kompetisie ontbyt met Lynette ZR6LHT

Die kinders het took die naweek geniet

Build a Saltwater Dummy Load

from K5LXP QSL.net

A great first project for the new ham.

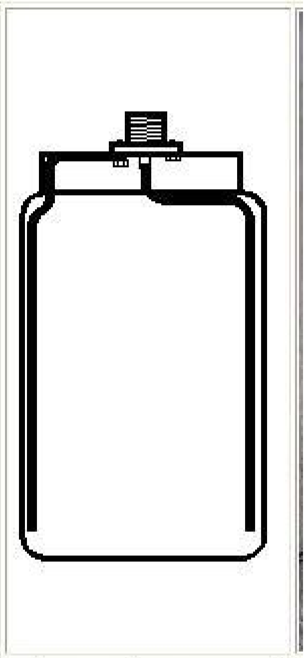
Background

How would you like to make a useful piece of ham radio test equipment for virtually no cost?

There are numerous plans in books, magazines and on the internet on how to build a dummy load out of noninductive resistors and some fabricated hardware, and maybe with a can of oil to stick it in so it doesn't overheat and burn up. Where is the fledgling ham to find "noninductive" resistors? What if they don't have a workshop or tools to fabricate the metal?
Here is a simple solution- the saltwater dummy load. Instead of a physical part or parts to provide the resistance, here we use plain water with a little salt added. The salt allows the water to conduct electricity, so the volume of water in the container becomes the resistive element. All we need is a container to hold the water and a connector to get the RF from the radio into it.

I can't recall where I learned of this first, but I'm sure the idea has been around a long, long time. I built my first saltwater load as a new ham back in the early 1980's. I've built them in containers as small as a baby food jar all the way up to a gallon pickle jar. The size (volume of water) will determine how many watts the load will dissipate before the water gets too hot. I found out the hard way glass jars will shatter if the water gets *too* hot, and plastic jars will get soft. So keep this in mind when sizing the container for your version.

There are some compromises using a dummy load like this. One, is it's not shielded. For most practical purposes, shielding isn't really necessary. Most of the RF will go into heating the water and very little will be radiated. Another issue is frequency. These loads appear resistive until you go up high enough in frequency to where the electrode lengths approach a significant portion of a wavelength, and the stray reactance becomes significant. Certainly any reasonably sized load will work up to 30 MHz, up to 50MHz is possible if care is taken in it's construction.



This is the general idea of what the finished container should look like.

Construction

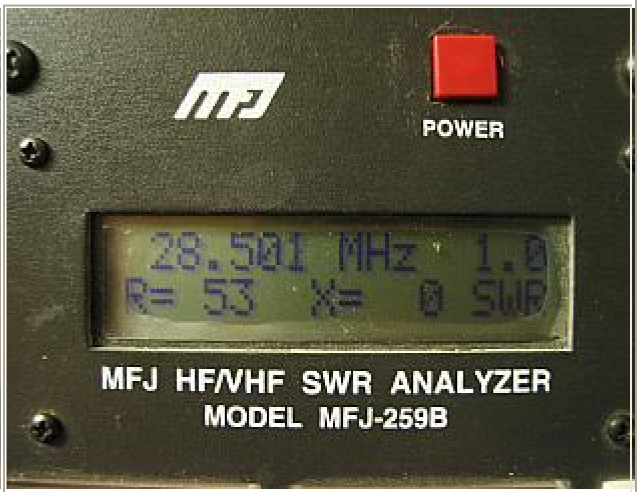
You can have fun with this part. About the only requirement is that the container hold water and be non conductive. I standardized on glass jars but pretty much anything you can come up with to hold water and an SO-239 connector will work. I have used both bare solid copper wire and tin plated copper wire for electrodes. The tinned electrodes seem to be a bit more resistant to the corrosive effects of the saltwater but either one seems to work equally well. Mount a chassis-mount SO-239 or BNC in the lid or cap of the container. Solder one electrode to the center pin, the other can wrap around one of the mounting screws and tighten the nut down on it. Bend the electrodes so that they are as far apart as possible inside the jar and parallel to each other. Cut them about 1/4-1/2 inch above the bottom of the container.

It might be a good idea at this point to goop up the connector underneath with silicone seal to prevent liquid from leaking out, and salt from corroding the connector and hardware.

"Alignment"

To "align" the saltwater load you need a transmitter capable of generating a few watts CW at the highest intended frequency of use (say 30MHz for a load intended for HF), an SWR bridge and some patch cables. If you have or can borrow an antenna analyzer like an MFJ-259 it makes this task a little easier.
Fill the container up with water. Put the lid on and make an SWR measurement-- it will measure pretty high. Now, using the tip of a knife as a spatula, add a tiny amount of salt to the water. Stir it up, secure the lid of the container and make another SWR measurement- it should be incrementally lower.
Keep adding salt until the SWR reaches 1:1. You want to "sneak up" on the 1:1 point without going past it.
If you put too much salt in and go past the 1:1 point you'll have to dump some of the solution out and add more fresh water. The actual amount of salt you'll need depends on how counductive your water is coming out of the tap, but in my load it worked out to be less than 1/4 teaspoon per pint of water. That's it! The saltwater load is now ready to use. Unless your container leaks or water evaporates out of it, the load's resistance won't change.

Alignment taking place on the 'bench'.



MFJ-259B Analyzer Display after Alignment.

HD Radio, High Definition Technology

from radio-electronics.com By *Ian Poole*

Digital technology is being applied to many areas of radio communication including radio broadcasting as it offers some significant advantages. While DAB digital radio is becoming established in some areas of the globe, the system that has been chosen for use in the USA is known as HD, or High Definition, Radio. Using HD Radio, will enable high quality audio to be received along with the ability to incorporate many new features and facilities.

The HD Radio system has been developed by iBiquity, and has now been selected by the FCC in the USA. It will take the place of both the existing AM and FM transmissions, and offers many advantages for both listeners and broadcasters alike:

- Improved audio quality - it is claimed that HD Radio broadcasts on the AM bands will be as good as current FM services and those on the FM band will offer CD quality audio.
- Reduced levels of interference. AM transmissions in particular are prone to static pops and bangs as well as high levels of background noise. HD Radio will almost eliminate this.
- Opportunity to use additional data services. By using digital technology, HD Radio provides the opportunity to add data services such as scrolling programme information, song titles, artist names, and much more.
- There is also the possibility of adding more advanced services such as surround sound, multiple audio sources, on-demand audio services, etc.
- Easy transition for broadcasters and listeners. Although new HD Radio receivers are required to receive the new transmissions in their digital format there is considerable re-use of infrastructure and spectrum.

HD Radio basics: HD Radio uses a variety of technologies to enable it to carry digital audio in an acceptable bandwidth and with the new high quality that is required. The transmission uses COFDM combined with specialised codec to compress the audio.

Note on OFDM: Orthogonal Frequency Division Multiplex (OFDM) is a form of transmission that uses a large number of close spaced carriers that are modulated with low rate data. Normally these signals would be expected to interfere with each other, but by making the signals orthogonal to each other there is no mutual interference. The data to be transmitted is split across all the carriers to give resilience against selective fading from multi-path effects.

Click on the link for an **OFDM tutorial**

One of the requirements for HD Radio was that it would maintain compatibility with existing stations. To achieve this there are two versions; one HD Radio system for AM, and the other for FM.

In what is termed hybrid mode, the AM version has a data rate of 36 kbps for the main audio channel and the version of HD radio for the FM bands carries 96 kbps. In addition to this HD radio can also be used to carry multiple audio channels, and in addition to this secondary channels for services such as weather, traffic and the like may be added. However adding additional channels will reduce the available bandwidth for the primary channel and audio quality may be impaired.

In hybrid mode a radio receiver will first lock onto an analogue signal. If this is possible, then it will try to find a stereo component (FM only) and finally it will endeavour to decode a digital signal. If the digital signal is lost then it will fall back to the analogue signal. The success of this process depends upon the transmitting station being able to synchronise the digital and analogue signals. Often the digitisation process takes a noticeable amount of time and the digital and analogue signals may not be transmitted in time with each other.

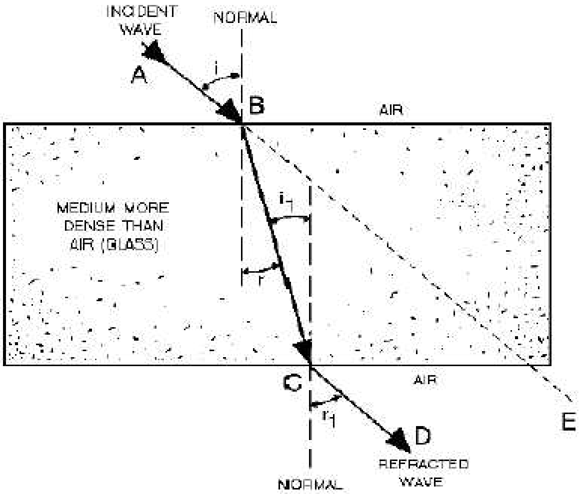
Once HD Radio is fully established, the hybrid mode may be removed and at this point no analogue information will be transmitted. However it is envisaged that this will take some time as this can only be viable when very few analogue radios are in use.

Refraction, diffraction and Doppler effect

When a wave passes from one medium into another medium that has a different velocity of propagation, a change in the direction of the wave will occur. This changing of direction as the wave enters the second medium is called REFRACTION.
As with reflection, the wave striking the boundary (surface) is called the INCIDENT WAVE, and the imaginary line perpendicular to the boundary is called the NORMAL.
The angle between the incident wave and the normal is called the ANGLE OF INCIDENCE.
As the wave passes through the boundary, it is bent either toward or away from the normal. The angle between the normal and the path of the wave through the second medium is the ANGLE OF REFRACTION.

A light wave passing through a block of glass is shown in figure 1-10. The wave moves from point A to B at a constant speed. This is the incident wave. As the wave penetrates the glass boundary at point B, the velocity of the wave is slowed down. This causes the wave to bend toward the normal. The wave then takes the path from point B to C through the glass and becomes BOTH the refracted wave from the top surface and the incident wave to the lower surface.

As the wave passes from the glass to the air (the second boundary), it is again refracted, this time away from the normal and takes the path from point C to D. As the wave passes through the last boundary, its velocity increases to the original velocity. As figure 1-10 shows, refracted waves can bend toward or away from the normal. This bending depends on the velocity of the wave through each medium. The broken line between points B and E is the path that the wave would travel if the two mediums (air and glass) had the same density.



To summarize
1. If the wave passes from a less dense medium to a more dense medium, it is bent toward the normal, and the angle of refraction (r) is less than the angle of incidence (i).
2. If the wave passes from a more dense to a less dense medium, it is bent away from the normal, and the angle of refraction (r_1) is greater than the angle of incidence (i_1

Diffraction

DIFFRACTION is the bending of the wave path when the waves meet an obstruction. The amount of diffraction depends on the wavelength of the wave. Higher frequency waves are rarely diffracted in the normal world that surrounds us. Since light waves are high frequency waves, you will rarely see light diffracted.
You can, however, observe diffraction in sound waves by listening to music. Suppose you are outdoors listening to a band. If you step behind a solid obstruction, such as a brick wall, you will hear mostly low notes. This is because the higher notes, having short wave lengths, undergo little or no diffraction and pass by or over the wall without wrapping around the wall and reaching your ears. The low notes, having longer wavelengths, wrap around the wall and reach your ears.
This leads to the general statement that lower frequency waves tend to diffract more than higher frequency waves. Broadcast band (AM band) radio waves (lower frequency waves) often travel over a mountain to the opposite side from their source because of diffraction, while higher frequency TV and FM signals from the same source tend to be stopped by the mountain.

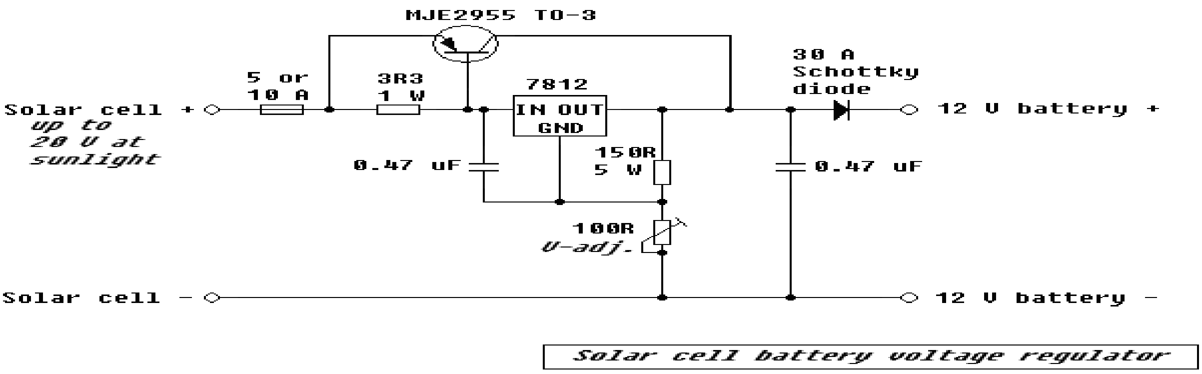
Doppler Effect

The last, but equally important, characteristic of a wave that we will discuss is the Doppler effect. The DOPPLER EFFECT is the apparent change in frequency or pitch when a sound source moves either toward or away from the listener, or when the listener moves either toward or away from the sound source. This principle, discovered by the Austrian physicist Christian Doppler, applies to all wave motion. The apparent change in frequency between the source of a wave and the receiver of the wave is because of relative motion between the source and the receiver.
To understand the Doppler effect, first assume that the frequency of a sound from a source is held constant. The wavelength of the sound will also remain constant. If both the source and the receiver of the sound remain stationary, the receiver will hear the same frequency sound produced by the source. This is because the receiver is receiving the same number of waves per second that the source is producing.
Now, if either the source or the receiver or both move toward the other, the receiver will perceive a higher frequency sound. This is because the receiver will receive a greater number of sound waves per second and interpret the greater number of waves as a higher frequency sound.
Conversely, if the source and the receiver are moving apart, the receiver will receive a smaller number of sound waves per second and will perceive a lower frequency sound. In both cases, the frequency of the sound produced by the source will have remained constant.
For example, the frequency of the whistle on a fast-moving train sounds increasingly higher in pitch as the train is approaching than when the train is departing. Although the whistle is generating sound waves of a constant frequency, and though they travel through the air at the same velocity in all directions, the distance between the approaching train and the listener is decreasing. As a result, each wave has less distance to travel to reach the observer than the wave preceding it. Thus, the waves arrive with decreasing intervals of time between them. These apparent changes in frequency, called the Doppler effect, affect the operation of equipment used to detect and measure wave energy. In dealing with electromagnetic wave propagation, the Doppler principle is used in equipment such as radar, target detection, weapons control, navigation, and sonar.

The DOPPLER EFFECT is the apparent change in frequency of a source as it moves toward or away from a detector. It can affect the operation of equipment used to detect and measure wave energy.

Please do not try this at home. (thanks Danny ZS6AW)

After our Sunday Bulletin insert about safety precautions when erecting or repairing antennas, listeners probably had simple towers and antennas in mind such as their own! This particular structure is a pretty hefty masterpiece of engineering that we can only dream about and the gentleman up there certainly has to know his limitations.



Long Term HF Propagation Prediction for Oct. 2013

Courtesy ZS6BTY

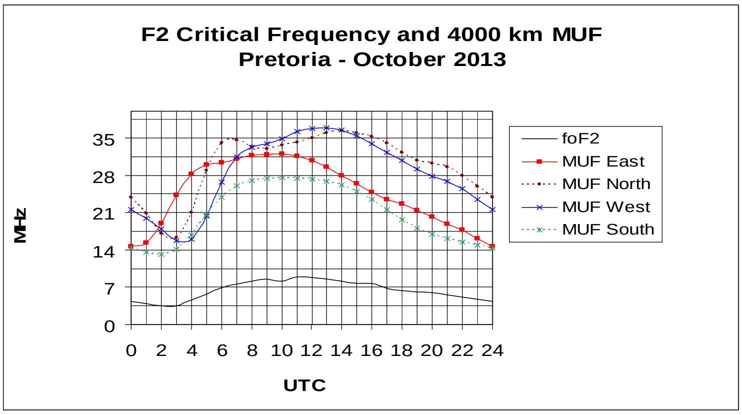
(see also our website propagation tab)

DX Operating

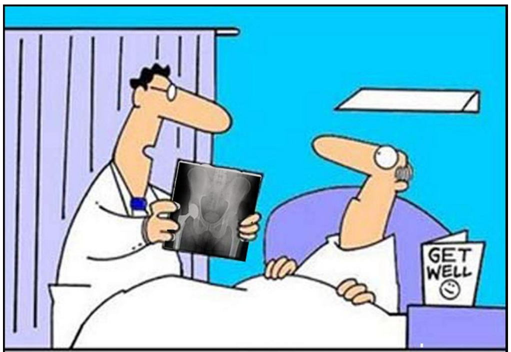
The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum frequency that will reflect when you transmit straight up. E-layer reflection is not shown.



In George Washington's days, there were no cameras. One's image was either sculpted or painted.
Some paintings of George Washington showed him standing behind a desk with one arm behind his back while others showed both legs and both arms.
Prices charged by painters were not based on how many people were to be painted, but by how many limbs were to be painted. Arms and legs are 'limbs,' therefore painting them would cost the buyer more.
Hence the expression, 'Okay, but it'll cost you an arm and a leg.' (Artists know hands and arms are more difficult to paint)



"Your x-ray showed a broken hip, but we fixed it with Photoshop."

Old Testament computing

In ancient Israel, it came to pass that a trader by the name of Abraham Com did take unto himself a young wife by the name of Dorothy. And Dot Com was a comely woman, broad of shoulder and long of leg.
Indeed, she was often called Amazon Dot Com.
And she said unto Abraham, her husband, "Why dost thou travel so far from town to town with thy goods when thou canst trade without ever leaving thy tent?"
Abraham did look at her as though she were several saddle bags short of a camel load but simply said, "How, dear?"
And Dot replied, "I will place drums in all the towns and drums in between to send messages saying what you have for sale, and they will reply telling you who hath the best price.
The sale can be made on the drums and delivery made by Uriah's Pony Stable (UPS)."
Abraham thought long and decided he would let Dot have her way with the drums.
And the drums rang out and were an immediate success.
Abraham sold all the goods he had at the top price, without ever having to move from his tent.
To prevent neighbouring countries from overhearing what the drums were saying, Dot devised a system that only she and the drummers knew.
It was known as Must Send Drum Over Sound (MSDOS), and she also developed a language to transmit ideas and pictures - Hebrew To The People (HTTP).
And the young men did take to Dot Com's trading as doth the greedy horsefly take to camel dung. They were called Nomadic Ecclesiastical Rich Dominican Sybarites, or NERDS.
And lo, the land was so feverish with joy at the new riches and the deafening sound of drums that no one noticed that the real riches were going to that enterprising drum dealer, Brother William of Gates, who bought off every drum maker in the land.
Indeed he did insist on drums to be made that would work only with Brother Gates' drumheads and drumsticks.
And Dot did say, "Oh, Abraham, what we have started is being taken over by others."
And Abraham looked out over the Bay of Ezekiel , or eBay as it came to be known.
He said, "We need a name that reflects what we are."
And Dot replied, "Young Ambitious Hebrew Owner Operators." "YAHOO," said Abraham.
And because it was Dot's idea, they named it YAHOO Dot Com.
Abraham's cousin, Joshua, being the young Gregarious Energetic Educated Kid (GEEK) that he was, soon started using Dot's drums to locate things around the countryside.
It soon became known as God's Own Official Guide to Locating Everything (GOOGLE).
That is how it all began. And that's the truth.